

1. A method for removing contaminants from a processing bath for processing semiconductor wafers, said method comprising:

rapidly removing an upper portion of the semiconductor processing fluid present in said bath while said wafers are in said bath.

2. The method for removing contaminants from a processing bath for processing semiconductor wafers according to claim 1, wherein said semiconductor processing bath is an etching bath.

3. The method for removing contaminants from a processing bath for processing semiconductor wafers according to claim 1, wherein said semiconductor processing bath is a cleaning bath.

4. The method for removing contaminants from a processing bath for processing semiconductor wafers according to claim 1, wherein said contaminants are removed from the air/liquid interface of the semiconductor processing bath.

5. The method for removing contaminants from a processing bath for processing semiconductor wafers according to claim 4, wherein said semiconductor processing bath is an etching bath.

6. The method for removing contaminants from a processing bath for processing semiconductor wafers according to claim 5, wherein said wherein said contaminants include silica.

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7. A method for reducing the contamination on a semiconductor wafer from a wet etching bath comprising:

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processing said semiconductor wafer in said wet etching bath;

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subsequently rapidly removing an upper portion of the etching fluid from said wet etching bath to remove contaminants from the surface of said wet etching bath while retaining said semiconductor wafer in said etching bath; and,

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subsequently removing said semiconductor wafer from said wet etching bath.

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8. The method for reducing the contamination on a semiconductor wafer from a wet etching bath according to claim 7, wherein a substantial portion of said etching fluid is removed.

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9. The method for reducing the contamination on a semiconductor wafer from a wet etching bath according to claim 8, wherein said upper portion of said etching fluid is removed by draining a top portion of said etching fluid from said wet etching bath.

10. The method for reducing the contamination on a semiconductor wafer from a wet etching bath according to claim 9, wherein said upper portion of said etching fluid is removed by a paddle from the top of said wet etching bath.

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11. The method for reducing the contamination on a semiconductor wafer from a wet etching bath according to claim 9, wherein said upper portion of said etching fluid is removed by opening a valve in said wet etching bath.

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12. The method for reducing the contamination on a semiconductor wafer from a wet etching bath according to claim 9, wherein said upper portion of said etching fluid is removed by hingedly releasing a door located at an upper portion of said wet etching bath.

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13. The method for reducing the contamination on a semiconductor wafer from a wet etching bath according to claim 9, wherein said upper portion of said etching fluid is removed by sliding a door located at an upper portion of said wet etching bath.

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14. The method for reducing the contamination on a semiconductor wafer from a wet etching bath according to claim 9, wherein said upper portion of said etching fluid is removed by rapidly removing a wafer boat containing said semiconductor wafer from said wet etching bath.

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15. The method for reducing the contamination on a semiconductor wafer from a wet etching bath according to claim 9, wherein said upper portion of said etching fluid is removed by telescopically collapsing said wet etching bath.

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16. The method for reducing the contamination on a semiconductor wafer from a wet etching bath according to claim 10, wherein said contaminants are removed from the air/liquid interface of said wet etching bath.

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17. A method for etching a semiconductor wafer, said method comprising:

15 placing etching fluid into an etching vessel;

20 placing said semiconductor wafer in said etching fluid;

25 contacting said semiconductor wafer with said etching fluid for a predetermined time;

30 rapidly removing a portion of said etching fluid from the upper surface of said etching vessel while keeping said semiconductor wafer immersed in said etching fluid; and,

35 removing said semiconductor wafer from said etching fluid.

18. The method according to claim 17, wherein said semiconductor wafer is a silicon wafer.

5 19. The method according to claim 18, wherein said etching fluid is an aqueous hydrofluoric acid solution.

10 Sub A2 20. The method according to claim 17, wherein said etching fluid is removed from the upper surface of said etching vessel by draining a top portion of said etching fluid from said wet etching vessel.

15 21. The method according to claim 20, wherein said upper portion of said etching fluid is removed by opening a valve in said wet etching vessel.

20 22. The method according to claim 20, wherein said upper portion of said etching fluid is removed by hingedly releasing a door located at an upper portion of said wet etching vessel.

25 23. The method according to claim 20, wherein said upper portion of said etching fluid is removed by sliding a door located at an upper portion of said wet etching vessel.

24. The method according to claim 20, wherein said upper portion of said etching fluid is removed by rapidly removing a wafer boat containing said semiconductor wafers from said wet etching vessel.

25. The method according to claim 20, wherein said upper portion of
said etching fluid is removed by telescopically collapsing said wet etching vessel.

5 26. The method according to claim 17, wherein said etching fluid is
removed from the upper surface of said etching vessel by physically removing a top
portion of said etching fluid from said wet etching vessel.

10 27. The method according to claim 26, wherein said upper portion of
said etching fluid is removed from said etching vessel by a paddle.

15 28. An etching bath apparatus for reducing the contamination of
semiconductor wafers during wet processing, said apparatus comprising:

20 an etching vessel having a sufficient volume to hold a predetermined
amount of etching fluid;

25 said etching vessel having a plurality of side walls, at least one of said
plurality of side walls having at least one gate located near the top of said side walls
to rapidly remove a portion of etching fluid from said etching vessel.

29. The etching bath apparatus according to claim 28, wherein etching
fluid is continuously fed into said etching vessel during processing and the excess
etching fluid is removed by cascading over the top of the plurality of side walls of
said etching vessel.

30. The etching bath apparatus according to claim 29, wherein said etching vessel has a single gate to remove to rapidly remove an upper portion of etching fluid from said etching vessel.

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31. The etching bath apparatus according to claim 30, wherein said upper portion of said etching solution is rapidly removed during the cascade operation.

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32. The etching apparatus according to claim 30, wherein said gate is hingedly attached to one of said side walls.

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33. The etching apparatus according to claim 30, wherein said at least one gate is slideably mounted to one of said plurality of walls.

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34. The etching apparatus according to claim 33, wherein said apparatus has a single gate.

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35. An etching vessel comprising:

a first hollow container;

a second hollow container;

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said first hollow container being located beneath said second hollow container and sealingly engaged to said second hollow container such that said first and said second hollow containers form said etching vessel;

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said first hollow container and said second hollow container having a size such that said second hollow container can slide over said first hollow container;

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said etching vessel having a sufficient volume to hold a predetermined amount of etching fluid; and

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wherein said second hollow container is moveable relative to said first hollow container to rapidly remove said etching fluid from an upper portion of said etching vessel.

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36. The etching vessel according to claim 35, wherein etching fluid is continuously fed into said etching vessel and the excess etching fluid is removed by cascading over the top said second hollow container.

37. An etching bath apparatus comprising:
an etching vessel, said etching vessel including means for rapidly removing a portion of the etching fluid from the upper portion of said etching vessel.

38. The etching bath apparatus according to claim 37, wherein said means for rapidly removing a portion of the etching fluid from the upper portion of said etching vessel includes a gate.

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39. The etching bath apparatus according to claim 37, wherein said means for rapidly removing a portion of the etching fluid from the upper portion of said etching vessel includes a slideable door.

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40. The etching bath apparatus according to claim 37, wherein said means for rapidly removing a portion of the etching fluid from the upper portion of said etching vessel includes a door.

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41. The etching bath apparatus according to claim 35, wherein said means for rapidly removing a portion of the etching fluid from the upper portion of said etching vessel includes a valve.

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42. The etching bath apparatus according to claim 37, wherein said means for rapidly removing a portion of the etching fluid from the upper portion of said etching vessel includes a paddle.

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43. The etching bath apparatus according to claim 37, wherein said means for rapidly removing a portion of the etching fluid from the upper portion of said etching vessel includes a collapsible member.

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44. A method for reducing the contaminants on a silicon wafer during a wet etching process, said method comprising:

5 immersing a wafer boat in an etching vessel having an etching fluid therein for a sufficient time to etch said silicon wafer;

10 rapidly removing said semiconductor boat from said etching vessel to remove contaminants residing on the upper surface of said etching fluid.

15 45. An apparatus for wet processing semiconductor wafers to reduce the contamination on the silicon wafer during a wet process, said apparatus comprising:

20 an etching vessel;

25 a semiconductor wafer boat;

20 a system for rapidly removing said semiconductor wafer boat from said etching vessel to remove surface contaminants from the etching fluid before said semiconductor wafers are removed from said etching fluid; and

25 an outer well.

46. The apparatus according to claim 45, wherein said etching vessel has baffles located at the bottom of said etching vessel to selectively allow etching fluid to flow past said wafer boat.

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47. The apparatus according to claim 45, wherein said system includes a moveable arm which is fixably mounted to said wafer boat.

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